#15 Ex(2) 4/Oppt

Docket 14249

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



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| First Named Inventor: | Peter Hagerlid | | |
| Appln. No.: | 09/719,960 | Group Art Unit: | 1655 |
| Filed: | June 14, 2001 | Examiner: | B. Sisson |
| Title: | REACTION MONITORING SYSTEM | | |

# RESPONSE TO OFFICE ACTION

Commissioner for Patents
Washington, D.C. 20231

I hereby certify that this document is being sent via First Class U. S. mail addressed to: Commissioner for Patents, Washington, D.C. 20231 on this 30th day of April, 2002.

Janet M Mercedes
(Signature)

Sir:

This paper is in response to the office Action mailed November 30, 2001 in the above-identified application. Applicants request a two month extension of time for responding to the Office Action and enclose a check in the amount of $400 in payment of the fee under 37 C.F.R. § 1.17(a)(2). Please amend the application as follows and consider the following remarks.

**IN THE CLAIMS:**

Please cancel Claim 25 without prejudice.

Please amend Claim 23 as follows:

--23. (Twice Amended) An apparatus for simultaneously monitoring an array of reaction sites for light indicating that a reaction is taking place at a particular site, comprising:

a sample receptacle for receiving a plurality of liquid samples at said array of reaction sites;

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a dispenser arranged for dispensing at least one reagent into said samples on said sample receptacle;

an optically sensitive device arranged so that in use the light emitted from a particular plurality of samples at said array of reaction sites will impinge upon corresponding predetermined regions of said optically sensitive device;

a light level determination device in connection with said optically sensitive device for simultaneously determining the level of light impinging upon each of said predetermined regions; and

a recorder in connection with said light level determination device to record the variation of said light level with time for each of said liquid samples.--

Please add the following new Claim 46.

--46. (New) An apparatus for identifying target bases in DNA sequences comprising:

a plate for receiving a plurality of liquid samples at respective reaction sites;

a dispenser arranged for dispensing at least one reagent into said samples on said plate;

an optically sensitive device arranged so that in use light generated by the reaction of a plurality of particular liquid samples on said plate signifying the incorporation of a nucleotide will impinge upon corresponding predetermined regions of said optically sensitive device;

a light level determination device in connection with said optically sensitive device for simultaneously determining the level of light impinging upon each of said predetermined regions; and

a recorder in connection with said light level determination device for recording the variation of said light level with time.--

## REMARKS

Claims 26-39 have been objected to for being in improper order, in that independent Claim 25 separates Claim 23 from the claims which depend from Claim 23. Claim 25 has been cancelled without prejudice and rewritten as new Claim 46. Withdrawal of the objection of Claims 26-39 is respectfully requested.

Claims 23-39 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite and confusing for failing to recite a structural relationship between the sample and dispenser. Claim 23 has been amended to specify that the dispenser is arranged for dispensing a reagent into the sample receptacle. Claim 25 has been cancelled without prejudice and rewritten as new Claim 46, which also specifies the relationship between the dispenser and the sample receptacle. Withdrawal of the rejection of Claims 23-39 under 35 U.S.C. § 112, second paragraph, is respectfully requested.

Claims 23-39 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly incomplete for omitting essential structural cooperative relationships for the sample receptacle, dispenser, optically sensitive device, light determination device and recorder. Claim 23 has been amended, and Claim 25 rewritten as new Claim 46, to recite the structural relationships between the elements of the claimed apparatus.

Claim 27 is allegedly confusing as to the arrangement of the apparatus "to monitor the reaction sites from underneath" through an apparently solid plate. As indicated in the specification at page 5, lines 1-4, the plate beneath the reaction site may be at least partially transparent. Accordingly, Applicants respectfully submit that the claim is clear and definite to one of ordinary skill in the art when viewed in light of the specification.

Claim 29 is allegedly rendered indefinite by the term "smaller." Applicants submit that the term is defined by the claims, which uses the term to compare spacing between the lenses of the array and the corresponding reaction sites. Further, the relative spacing is explained in detail in the specification at page 7, lines 16-28 and page 12, lines 1-11. One of ordinary skill in the art would be apprised of the scope of the invention by the language of the claims in light of the teachings of the specification.

Claim 37 is allegedly indefinite in the term "channels in a block." The Examiner has alleged that the word "block" is an adjective, and that the noun it modifies is missing. Applicants respectfully admit that the term "block" in Claim 37 is a noun, and that the language of the claim is clear and definite in view of the specification at page 6, lines 10-17.

In view of the foregoing comments and amendments, withdrawal of the objection of Claims 23-39 under 35 U.S.C. § 112, second paragraph is respectfully requested.

Claims 23-39 have been rejected under 35 U.S.C. § 103(a) as allegedly rendered obvious by U.S. Patent No. 5,104,621 to Pfost et al. ("Pfost et al.") in view of U.S. Patent No. 6,263,095 to Rushbrooke et al. ("Rushbrooke et al."). The Examiner has alleged that Pfost et al. disclose an apparatus comprising a plate for receiving sample receptacles, dispensing means for delivering a sample and/or reagents, illumination means, optical detection means, and data storage and analysis means. The Examiner has alleged that the optical sensing means can be used to measure liquid level, optical density, and also signals generated from a reaction in the sample means. Rushbrooke et al. allegedly teach use of a charge coupled device (CCD) to detect, measure and evaluate light signals from biochemical assays. The Examiner has alleged that it would have been obvious to use the CCD technology of Rushbrooke et al. in the device of Pfost et al.

Applicants respectfully submit that the combination of references cited by the Examiner fails to teach or suggest the present invention. In particular, Pfost et al. disclose a device for measuring the optical density of a sample, but do not teach or suggest a means for measuring light generated at a reaction site. Accordingly, those embodiments of Pfost et al. which have an optical detection means must also have a light source. A physical light source is not required in the present apparatus, since light is chemically generated at the reaction site. Further, while Pfost et al. disclose an apparatus capable of measuring the optical density of a plurality of samples in an automated, sequential manner, the reference fails to teach or suggest an apparatus that simultaneously determines the light generated from an array of reaction sites. In the present invention, an image of an array, not an individual sample, impinges upon the optically sensitive device. Still further, Pfost et al. disclose a means for detecting an absolute amount of optical radiation absorbed by a sample, but fail to teach or suggest a means for determining the variation

of the light level generated over time for each of a plurality of reaction sites. Rushbrooke et al. fail to provide any teaching that ameliorates the deficiencies of Pfost et al.

The claims have been amended to clarify that the optically sensitive device is arranged so that light emitted from a plurality of liquid samples at an array of reaction sites impinges upon corresponding predetermined regions of the optically sensitive device, and that the light level determinatien device simultaneously determines the level of light impinging upon those regions. Support for these amendments may be found in the specification, for example at page 2, lines 33-36 and page 3, line 37 – page 4, line 22.

Accordingly it is respectfully submitted that the combination of cited references fails to teach or suggest the present invention. Withdrawal of the rejection of Claims 23-39 under 35 U.S.C. § 103(a) is respectfully requested.

In view of the foregoing comments and amendments, it is respectfully submitted that the present application is in condition for allowance. Favorable reconsideration of all pending claims is earnestly solicited.

Respectfully submitted,

DORSEY & WHITNEY LLP

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